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Yosemite Slough

Geotechnical Investigation Briefing

April 17, 2012

Outline

- Purpose
- Scope of Work
- Project Status
- Preliminary Findings
- Initial Conclusions

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Purpose

- Collect geotechnical data to support engineering evaluation of remedial alternatives and specific design elements, including:
  - Cofferdam structure
  - Sediment capping
  - Sediment removal

Data Needs

- Subsurface stratigraphy
- Sediment and bedrock physical properties, index properties, density/consistency, undrained shear strength and compressibility of soft bay mud.

Scope of Work

- Six geotechnical borings with Shelby tube and split spoon sampling
- Rock coring at one location (AUS-B-05)
- Three co-located vane shear test (VST) explorations to measure undrained shear strength of soft bay mud
- Geotechnical laboratory testing
  - Index properties/soil classification
  - Strength testing
  - Consolidation testing

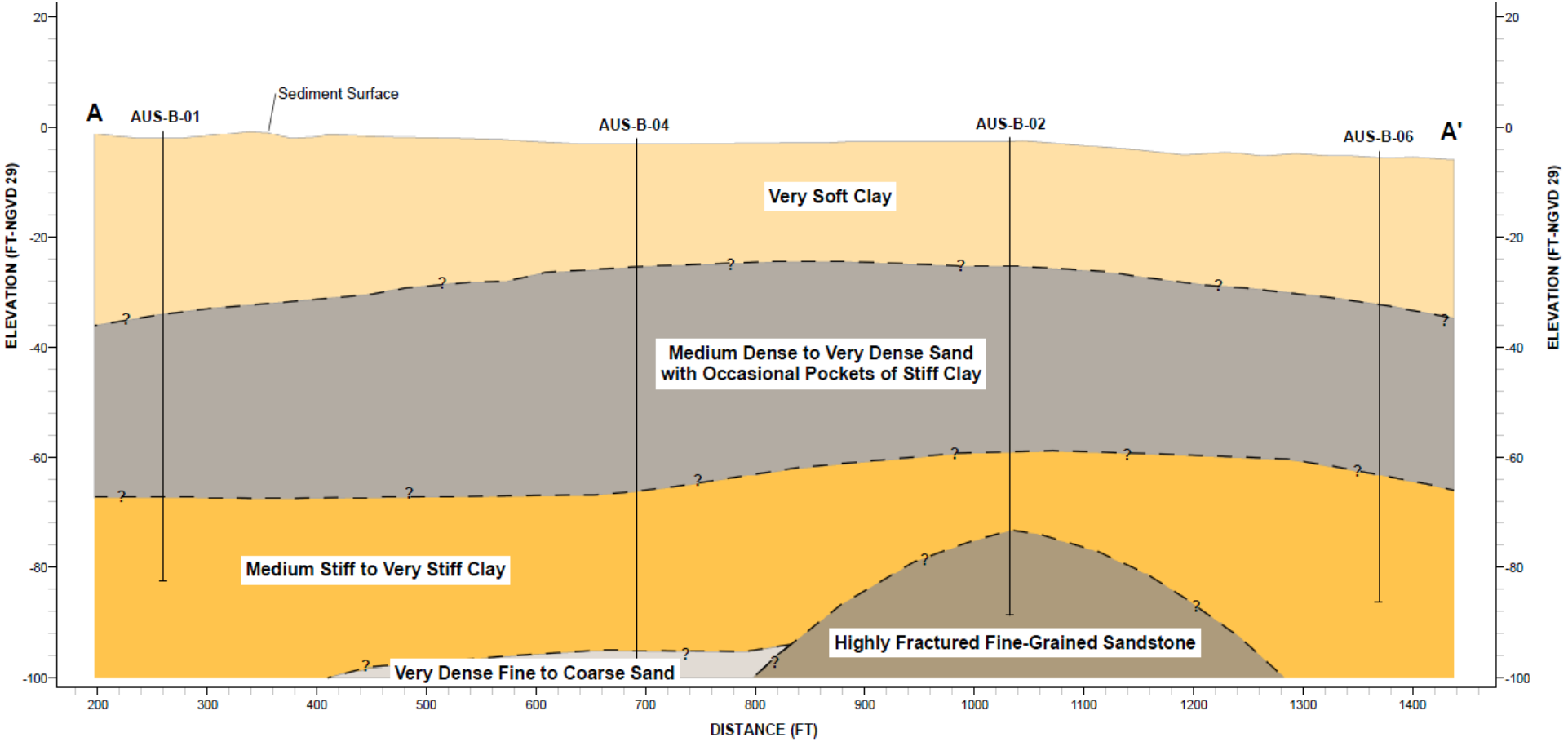
Project Status

- Field work completed March 23
- Draft boring logs under review
- Draft VST results received
- Geotechnical lab testing in progress
- Schedule for Geotechnical Data Report
  - Report preparation in progress.
  - Submit report to EPA on May 18.

Site and Exploration Plan

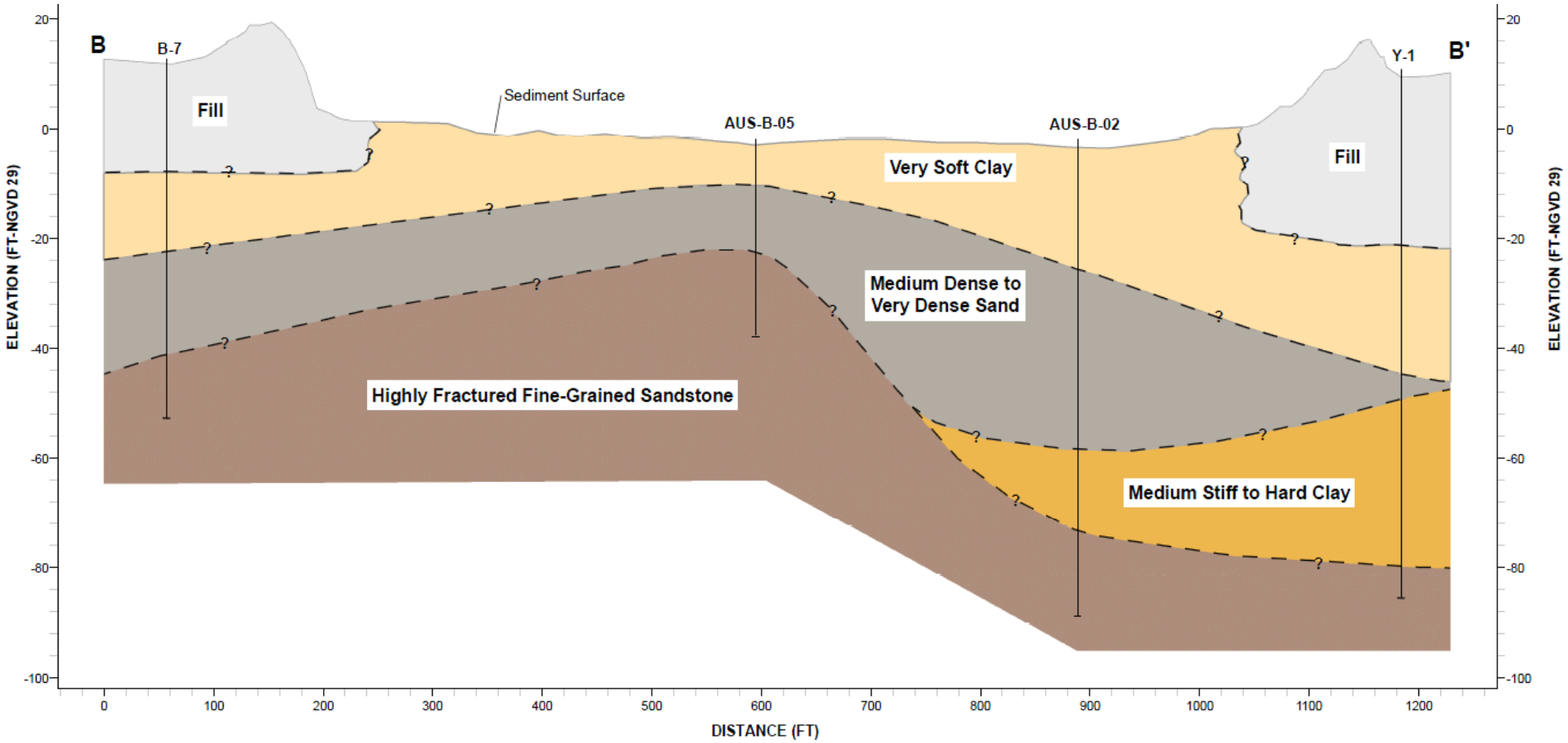
Preliminary Findings

Subsurface Stratigraphy – Cross Section A-A'



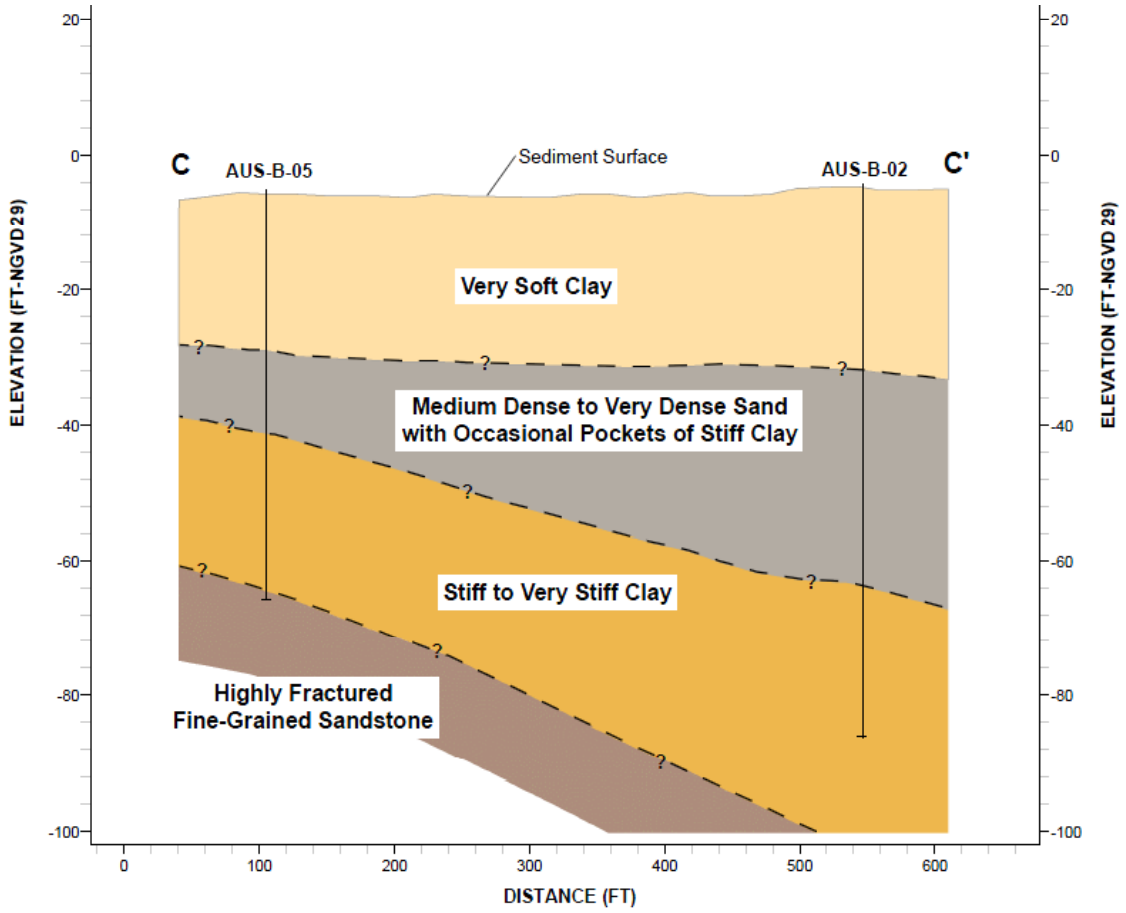
Preliminary Findings

Subsurface Stratigraphy – Cross Section B-B'



Preliminary Findings

Subsurface Stratigraphy – Cross Section C-C'



Preliminary Findings

Physical Properties

- Young Bay Mud
  - Very soft CLAY; Approx. 10 – 25 ft thick.
- Older Bay Sediments
  - Upper Layer: Medium dense to very dense fine SAND; Approx. 5 – 30 ft thick.
  - Lower Layer: Stiff to very stiff CLAY; Approx. 10 – 20 ft thick.
- Bedrock
  - Bedrock surface elevation highly variable; Encountered 20 to >96 ft bss; Highly fractured zone (>15 ft).

Initial Conclusions

Young Bay Mud

- Young Bay Mud (i.e., upper sediment layer) is very soft.
- Low bearing capacity and general soft “mucky” nature of the material may present significant challenges for excavating “in the dry”.
- A carefully designed and installed sediment cap is feasible.
- Bay Mud will not provide significant strength for sheet pile stability; Sheet piles will need to be driven into underlying older bay sediments or supported laterally (e.g., using batter piles).

Initial Conclusions

Older Bay Sediment

- The thickness of this layer varies significantly because of the highly variable bedrock surface elevation.
- The older bay sediments are significantly more competent that the overlying Young Bay Mud and will provide stability to sheet piling that can driven deep enough into this layer.
- Shallow bedrock will prevent sheet pile embedment in some layers.
- Older bay sediments contain some relatively dense/hard material that will present challenges in terms of driving sheets → An impact hammer will likely be required and the related noise could be an issue.

Initial Conclusions

Bedrock

- Bedrock surface elevation varies significantly:
  - Feasibility and challenges of installing a sheet pile cofferdam will depend greatly on the location of the cofferdam.
  - Cantilever sheet pile cofferdam likely not feasible in all areas because of shallow bedrock (would need lateral support; e.g., rock socketed batter piles)
  - Sheet pile installation would likely face significant challenges in transition areas between shallow and deep bedrock.
- Although the bedrock is highly fractured, it will not be possible to drive sheet piles into the rock.

Initial Conclusions

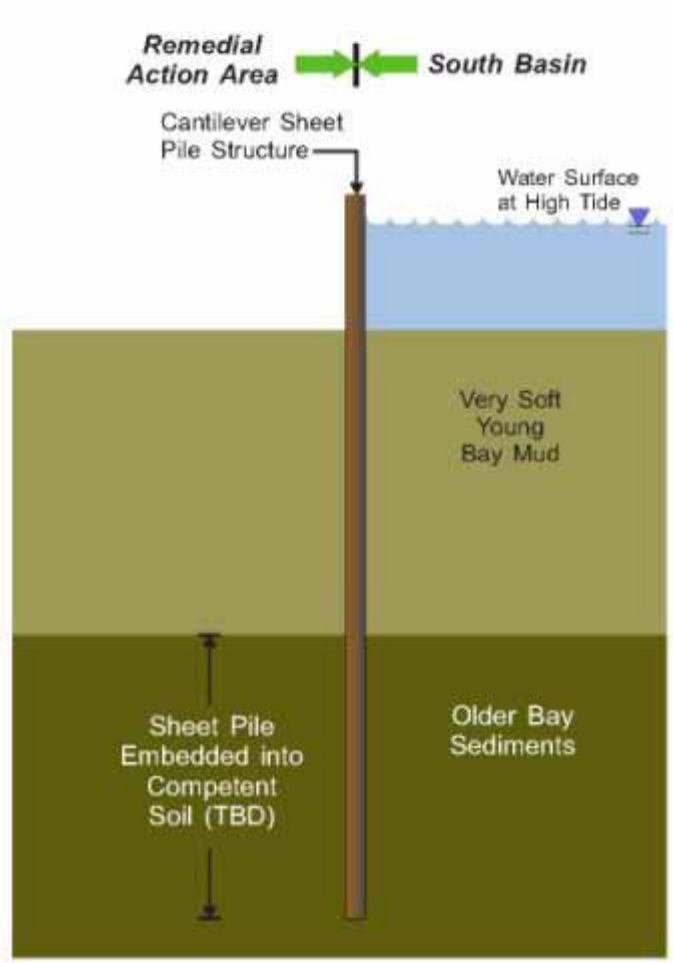
Cofferdam Feasibility

- Due to the high variability in the bedrock surface elevation and shallow bedrock in some areas, the feasibility and challenges of installing a sheet pile cofferdam will depend greatly on the location of the cofferdam.
- A cofferdam alignment close to the rock outcrop in South Basin may face significant challenges because of the shallow rock and the transition between shallow and deep bedrock.
- Engineering and installation time and cost issues will be significant.

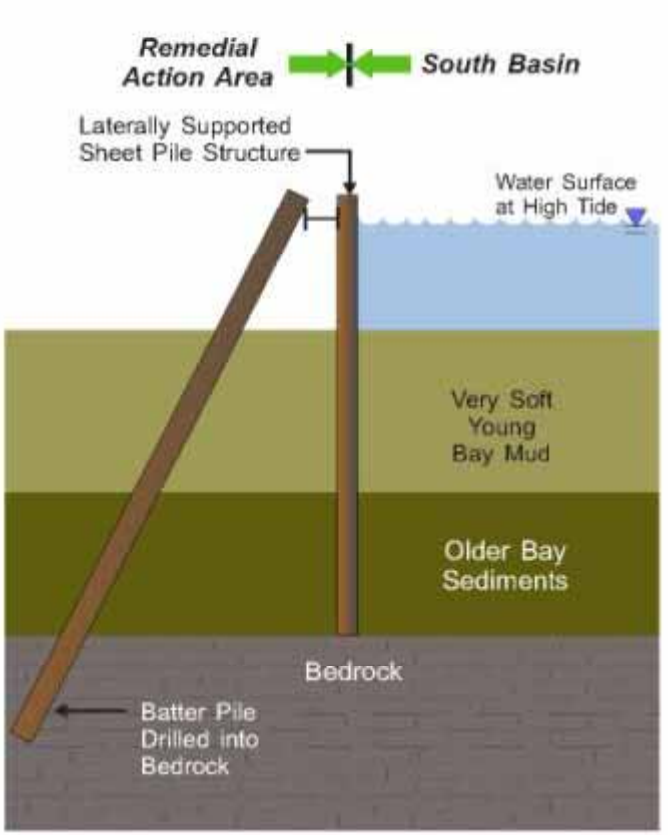
Initial Conclusions

Sheet Pile Cofferdam to Allow Excavation "in the Dry"

DEEP BEDROCK



SHALLOW BEDROCK



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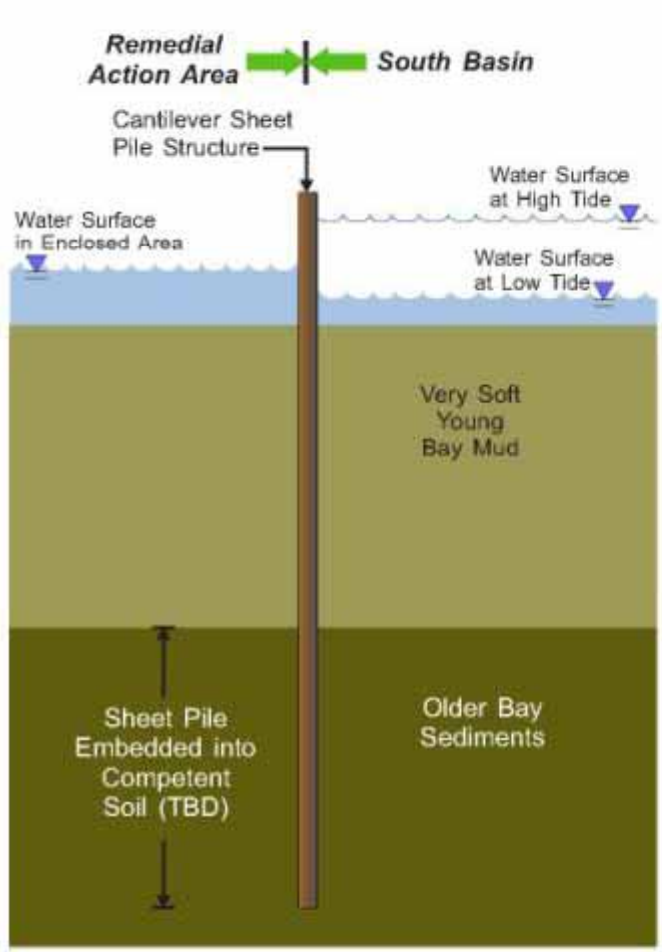
Initial Conclusions

Sheet Pile Cofferdam to Allow Barge-Mounted Dredging

DEEP BEDROCK



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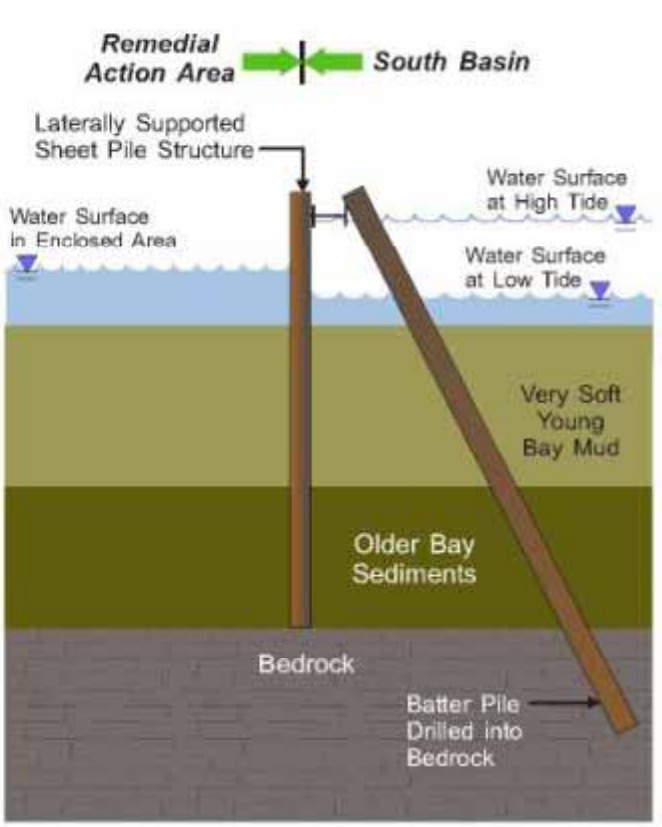
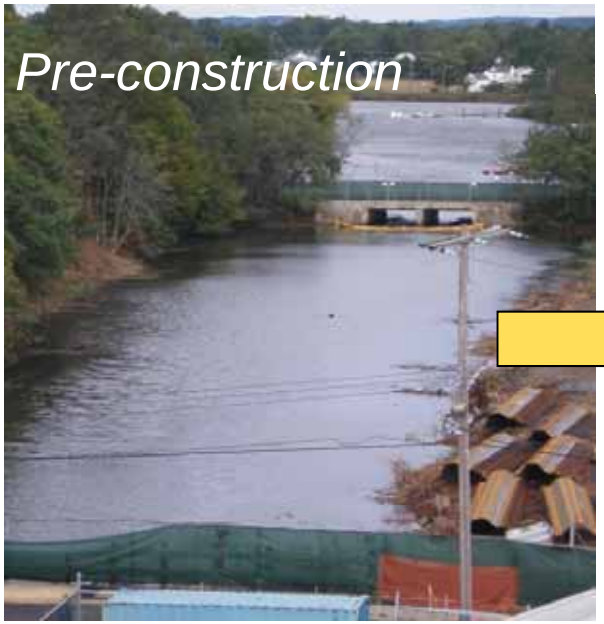


Flow Diversion



Cofferdam Examples

Dredging "In the wet"

Dredging "In the dry"

Initial Conclusions

Sediment Removal

- Low strength and generally soft “mucky” nature of the Young Bay Mud may present challenges for excavating sediment “in the dry”
- Equipment access must be considered
- Low strength sediments would require use of timber crane mats or other temporary platforms to access material
- Odor/air emissions considerations for exposed Bay Mud

Sediment Removal Examples

Sediment excavation "In the dry"

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Initial Conclusions

Dewatering

- Dredged sediment needs to be dewatered before offsite transport
- Geotextile tubes may be a possibility, depending on dewatering test results
- “Passive” dewatering techniques, such as geotextile tubes or gravity dewatering, may require stabilization amendments as a second step after initial dewatering

Dewatering

Dewatering Footprint

Initial Conclusions

Capping

- A carefully designed and installed sediment cap is feasible.
- Initial geotechnical results indicate capping would be possible on Young Bay Mud.
- It would be consistent with the aquatic environment of Yosemite Slough and the natural recovery processes in progress.
- Less impacted sediment and more clean material to handle and transport.

Capping

Completed cap shoreline

Cap placement

Questions/Discussion

